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BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking Regarding Microgrids Pursuant to Senate Bill 1339.	Rulemaking 19-09-009 (Filed September 12, 2019)

COMMENTS OF TESLA, INC. ON THE PRELIMINARY SCOPING MEMO AND ISSUES IDENTIFIED IN THE ORDER INSTITUTING RULEMAKING

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Pursuant to the Order Instituting Rulemaking (OIR) issued on September 19, 2019, Tesla, Inc. (Tesla) respectfully submits these brief comments regarding the scope of issues identified therein. Consistent with the process identified in the OIR, Tesla files these comments with the understanding that comments will serve in lieu of a separate motion for party status. In this filing, we identify a number of issues that we believe the Commission should address in addition to those issues already teed-up for consideration.

I. OVERVIEW OF TESLA

Tesla's mission is to accelerate the world's transition to sustainable energy. In the service of this mission, Tesla has dedicated itself to electrifying transportation through the manufacture and sale of advanced electric vehicles as well as key clean energy technologies, including battery storage and solar photovoltaic systems. By electrifying the transportation sector and decarbonizing electricity production, substantial progress can be made in addressing climate change and the serious threat it poses, recognizing the significant share of greenhouse gas emissions that are directly attributable to the transportation and energy sectors. To date, Tesla has delivered over 600,000 electric vehicles worldwide and has deployed over two gigawatt-hour (GWh) of energy storage and over three gigawatts (GW) of solar. Relevant to

this proceeding, Tesla also has significant experience deploying microgrids. This includes more than 80 MWh of industrial microgrids deployed to date. Project experience encompasses projects in Puerto Rico as part of recovery efforts in the aftermath of Hurricane Maria, deploying microgrids to meet energy needs in remote island communities, as well as specific experience deploying microgrids in California, all of which informs the perspectives we offer in this docket.

II. BACKGROUND AND CONTEXT

In September of this year, the Commission opened this proceeding to implement Senate Bill 1339, which directs the Commission to take certain actions to support the commercialization of microgrids by December 1, 2020. Given the recent experience with the large-scale public safety power shutoff (PSPS) in northern California, and the ongoing risk that millions of customers face of both planned and unplanned outages given fire and other risks, the Commission's initiation of this proceeding is timely. As recognized by the legislature, microgrids represent a compelling option for electricity customers, who see "potential benefits of investing in their own distributed energy resources as part of microgrids, both to ensure their own level of reliability and to better manage their own usage." In the wake of the recent public safety power shut-off events, the value that microgrids can provide as a resiliency solution should be front and center for the Commission. While microgrids can offer value to customers in a number of different ways, in the immediate term, Tesla believes there is a clear need to develop the regulatory and market framework specifically to support the deployment of microgrids for resiliency purposes. It is from this perspective that Tesla approaches this docket. Specifically, Tesla believes this proceeding should seek to identify and address the changes needed to make resiliency-driven microgrids a viable option for the customers and communities that now face an increased risk of prolonged outage due to fire risk and fire-risk management strategies as well as other natural disasters.

III. DISCUSSION

Tesla believes there are a number of key issues and considerations that the Commission should address to make microgrids a viable solution to address customer resiliency need in addition to those already identified in the OIR. We discuss each of these areas below.

a. The regulatory regime to which different types of microgrids are subject is an area in need of further clarification and guidance.

Microgrids can take myriad forms, ranging from single-premise behind-the-meter microgrids, like the thousands of solar-paired storage projects that have already been deployed in the state, to substantially more complex arrangements involving multiple customers behind multiple meters being served by a diverse web of distributed resources including solar, storage and conventional generators. As we look to more complex arrangements, a key source of uncertainty are outstanding questions regarding the regulatory "status" of a microgrid operator. Specifically, at what point would a microgrid operator be deemed a public utility? Absent clear guidance on this issue, the specter of being designated a public utility and subject to full weight of regulation such a designation engenders, or the risk of being found to be in violation of the incumbent utility's franchise to provide electricity service in its service territory, will continue to prevent third-party owned and operated microgrid projects outside of the simplest arrangements from moving forward. For example, a community that is interested in deploying a microgrid to ensure power to a town center in the event of an outage may be unable to proceed if the provision of service to multiple buildings on different utility service accounts would be viewed as providing utility service.

Tesla appreciates that this raises important legal questions specifically pertaining to the applicability of Public Utilities Code § 218, which determines when the provision of electrical service constitutes an "over the fence" sale and thus crosses into the realm of utility service.[1] Whether there are certain extenuating circumstances where exceptions to the strictures of the code may be allowed, for example

[1] See "Letting Solar Shine: An Argument to Temper the Over the Fence Rule" (Tim Lindl, Ecology Law Quarterly, 2009) for a good primer on the implications of PUC § 218 on opportunities to deploy and utilize distributed energy resources. https://scholarship.law.berkeley.edu/cgi/viewcontent.cgi?article=1912&context=elq

during emergency circumstances where the utility is not providing power, is a key issue that requires consideration. If such exemptions may be granted, the issue of what level of regulatory oversight should be applied to alternative arrangements remains.

On this latter issue, we believe that the approach taken in Puerto Rico may be instructive. Pursuant to recently adopted regulations there, the level of regulatory oversight is a function of the type and structure of microgrid under consideration. Under this regime, "Personal Microgrids" are subject to minimal regulation, "Cooperative Microgrids" are subject to somewhat more regulatory oversight, and "Third Party Microgrids" are subject to a more expansive body of regulatory requirements.[2] This hierarchical approach to microgrid regulation has merit and provides a useful construct for consideration in the instant proceeding.

b. The Commission should address the conditions under which a microgrid operator can leverage utility-owned infrastructure to provide resiliency and other services.

In the prior section, Tesla offered a high-level vision of a community microgrid to keep a town center powered during a broader grid outage. In addition to questions regarding the regulatory status of such a microgrid, this example also raises a number of other important questions including whether and under what terms such a microgrid would be able to leverage the utility's distribution infrastructure. Tesla believes this will be a significant issue where Commission guidance could be extremely helpful by ensuring that there are reasonable parameters and expectations to facilitate this type of deployment, given the tremendous benefits and opportunity it provides to support efforts to improve resiliency. An important aspect of this that will need to be explored includes how to ensure that the operation of such microgrids is done in a way that does not undermine the fire-mitigation objectives of the de-energization event in the first place. Close coordination with the utility and contractual arrangements that appropriately allocate risks between the community that deploys such a microgrid and the utility whose infrastructure the microgrid would utilize are areas of inquiry that the Commission should undertake in

[2] Resolution adopting the Final Microgrid Regulation pursuant to Act 57-2014, May 16, 2018; http://energia.pr.gov/wp-content/uploads/2018/05/Resolution-Adoptation-of-Microgrid-Regulation-Final.pdf

this docket. Beyond the provision of resiliency services, the ability and terms under which a microgrid operator can use existing utility infrastructure to provide services to customers that are part of a microgrid is also an open question that should be addressed as part of these deliberations.

c. Microgrids for resiliency should be treated comparably to more conventional grid hardening investments.

Tesla fully expects that in the coming years the utilities will put forward plans to harden and adapt their infrastructure and operations to be able to better respond to elevated fire risks. Microgrids represent one potential solution that should be considered alongside other, more conventional solutions, much in the way that the utilities are currently required to consider distributed energy resources as potential alternatives to conventional distribution investments pursuant to the distribution deferral framework adopted by the Commission in the integrated distributed energy resources proceeding. To the degree investment in microgrids represents a cost-effective alternative to other options, Tesla believes it will also be important to consider cost allocation issues that could disadvantage microgrids relative to other investments that serve similar purposes. Specifically, Tesla asks that microgrids not be viewed as categorically different than other grid hardening investments intended to make electrical service more reliable in a given community from a cost allocation standpoint.

For example, if there is a remote community where undergrounding a portion of a transmission line serving that community is pursued as a means to reduce the likelihood of de-energization, Tesla's understanding is that the associated costs would be socialized across the broad body of ratepayers. In this example, it is conceivable that a microgrid project could achieve the same result at lower cost; however, it is not clear if investments in this microgrid could also be socialized. If the cost recovery regime is such that the community would bear the entire costs of the microgrid, it would be clearly disadvantaged relative to undergrounding even if it is considerably more cost effective. For this reason, it will be important for the Commission to ensure that microgrids are not viewed in a categorically different manner than grid hardening and other investments intended to enhance resiliency, and subject to comparable cost-recovery treatment.

d. The value of resiliency needs to be recognized and compensated.

Tesla's experience with microgrid deployment strongly suggests that among the biggest challenges facing microgrid deployment for resiliency purposes relate to project economics. Certain regulatory issues like some of those discussed above are important factors, but addressing those would not, in of themselves, drive meaningful deployment of microgrids largely because resiliency benefits are not well or easily quantified and there is no direct market mechanism that internalizes the full value of resiliency investments. Even in the case of microgrids that serve a private entity, there are significant spillover benefits that accrue to society more broadly, further complicating efforts to place a value on the resiliency service. Nonetheless, the value is clearly non-zero and without some effort to recognize and internalize this value, resiliency investments will fall below what is socially optimal.

For this reason, Tesla was pleased to see the language in the statute and OIR regarding the establishment of rates and tariffs to support microgrids. Tesla believes this will be a key aspect of this initiative and we encourage the Commission to develop tariffs that provide compensation to microgrids for the provision of resiliency services. High level questions that will need to be addressed as part of this include (1) what types of microgrid projects would be eligible for such compensation (e.g. those located in areas and serving communities that are subject to high fire risk and PSPS events, those serving critical infrastructure facilities more broadly, etc.), (2) what level and on what basis would such compensation be provided, and (3) what oversight or validation would participating microgrid projects be subject to. Related to the question regarding the types of microgrid projects that would be eligible and consistent with the language in the statute regarding not compensating a customer for the use of diesel back-up or natural gas generation, Tesla believes that the Commission should also consider establishing a minimum renewable energy contribution requirement to ensure that the deployment of microgrids pursuant to this effort remains broadly consistent with the state's clean energy policy goals. The level of renewable energy required (versus the role of conventional assets) will need to be balanced against questions of cost and practicality.

e. The Commission should look beyond pilots in the immediate term.

The OIR suggests that the Commission may consider launching "pilot microgrid programs to benefit communities most likely to be affected by public safety power shutoffs".[3] Tesla strongly believes that though well-intentioned, limiting opportunities to deploy community microgrids to pilots is misguided based on the extensive real-world experience that entities, like Tesla, already have deploying and operating microgrids of varying complexity. In Attachment A to this filing, Tesla provides a high-level overview of a number of microgrid projects that reflects Tesla's deep experience deploying microgrid solutions. This is a small subset of the microgrid projects we have deployed overall, including thousands of single premise solar-plus-storage systems. Tesla does not believe there are specific technical challenges that pilots are needed to unearth at this time; the principle issues impeding more widespread adoption are regulatory and financial, not technical in nature. Further, small one-off pilot projects have substantial programmatic costs that are hard for many developers to justify for a relatively small amount of revenue. As the PSPS events in northern California have demonstrated, there is an urgent need to facilitate resiliency investments, including microgrids. A pilot program would be a woefully insufficient response to the exigencies at hand. Thus, the Commission should look to develop policies and programs that will begin the systematic and replicable deployment of microgrids throughout the grid.

IV. CONCLUSION

Tesla appreciates the opportunity to submit these comments regarding the scope of issues to be explored in this proceeding and looks forward to future engagement in this docket.

Respectfully submitted,

/s/ Andy Schwartz

[3] OIR, pg. 2

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Attachment A – Example Microgrid Projects

"Tesla's technical expertise and the functionality of their system is a cornerstone of our microgrid's operational success. We are already seeking to expand the use of Powerpacks in other facilities here at the Rancheria."
Jana Ganion, Blue Lake Rancheria Sustainability Director

OPPORTUNITY

Blue Lake Rancheria is a century-old Native American reservation covering 100-acres in Northern California. To relieve the Tribe of the risks associated with being connected to California's larger grid by just a single line, Blue Lake Rancheria searched a solution that could guarantee clean, affordable, reliable power for most days of the year.

SOLUTION

Blue Lake launched a low-carbon community microgrid that is helping reduce electricity costs and improve reliability for its residents and businesses. The microgrid uses intelligent software to operate a 500 kW solar photovoltaic system and a 950 kWh Powerpack system, which enables the reservation to operate independently from the power grid while still staying grid-connected. The storage system is able to detect a grid outage, disconnect from the grid and automatically run the Tribe off Powerpack and solar without interruption. Community members will not even know that there was a grid outage.

RESULTS

The solar and Powerpack microgrid system helps the Tribe reduce peak loads and conduct other energy management optimization to help relieve pressures on the larger grid. It is estimated that the microgrid system will save the Tribe over $200,000 in annual energy costs, reduce at least 150 tons of carbon per year, and grow Tribal clean energy jobs by 10 percent. The deployment represents industry-leading standard for collaboration between state, tribal, federal, and local entities, academia, technology providers, and utility partners.

Customer
Blue Lake Rancheria

Location
Humboldt County, CA

System Size
950 kWh

Applications
Microgrid
Peak Reduction
Backup

Commissioned
2017

TESLA ENERGY PRODUCTS

"Without the new battery energy storage systems and grid controller, the grid would not be able to operate efficiently with such a high percentage of solar penetration in Samoa."
Tuilaepa Aiono Sailele Malielegaoi, Prime Minister, Samoa

OPPORTUNITY

Samoa has a goal of achieving 100% renewable energy by 2025 and had already taken significant steps toward achieving this goal by installing five large solar farms, seven hydroelectric power generators, and one wind farm to reduce their reliance on diesel-fired baseload power. These different power sources were balanced on the grid manually which introduced reliability issues for the 160,000 people living across the island, negatively impacting the tourism-based economy.

SOLUTION

The Tesla Grid Controller was deployed to automatically manage the existing diesel, solar, wind, and hydro plants, as well as two new Tesla battery installations totaling 13.6 MWh that were installed in strategic locations to manage voltage, support grid frequency, and store excess renewables. The new Grid Controller would act as the grid's central nervous system, intelligently balancing supply and demand while improving grid stability. To design the Grid Controller, Tesla collected grid-level load and generation data and led power flow and transient stability studies to analyze Samoa's electric grid, informing the tuning of the battery system grid support functions like frequency and voltage support. Tesla integrated the Grid Controller with the utility's SCADA system and worked closely with the utility to test the system's automated operations.

RESULTS

The Grid Controller has been automatically managing the Tesla battery installations and existing generation assets since April of 2018 and has greatly improved grid stability. By adding battery storage capacity, Samoa can confidently deploy additional renewable energy, knowing that excess production will be stored for later use.

Customer
Samoa Electric Power Corporation

Location
Upolu, Samoa

Project size
8 MW / 13.6 MWh

Applications
Grid Stability
Grid Management
Renewable Shifting

Commissioned
April, 2018

TESLA

ENERGY PRODUCTS

"For the first time, we have introduced battery storage as a power source for emergency backup of trains. In a grid outage, it is now possible to move a train that has stopped in the underground section of the Namba Line or Ikoma Tunnel, keeping the customers safe."
Kintetsu Railway Co.,Ltd

OPPORTUNITY

Kintetsu is a leading private railway company in Japan. Japan is subject to typhoons & earthquakes, causing major grid outages across the country. During these natural disasters, Kintetsu's trains can be left without power and stuck in compromising positions, such as tunnels or underneath bridges. To protect the safety of their passengers, Kintetsu were in search of a system that could provide emergency backup while reducing peak demand.

SOLUTION

Looking for a way to provide an emergency backup solution while reducing peak demand costs, Kintetsu deployed a 4.2 MW | 7.1 MWH Tesla Powerpack at a substation in Osaka. The Powerpack has been designed to discharge 4.2 MW to move a train safely to the nearest station in the instance of a grid outage. Additionally, the Powerpack charges and discharges based on the forecast of the external controller, minimising peak demand.

RESULTS

The Powerpack will be able to provide power to move a train to a safer position during a grid outage, improving Kintetsu's infrastructure security against natural disasters. Kintetsu will also dispatch energy from Powerpack during commuting rush hours in the morning and evening, which previously created peak demand.

Customer
Kintetsu Railway Co.,Ltd

Location
Osaka, Japan

Powerpack size
4.2 MW | 7.1 MWH

Applications
Peak Shaving
Emergency Backup
VPP Demand Response

Commissioned
February 2019

TESLA ENERGY PRODUCTS

Attachment A – Example Microgrid Projects

"This project will help lessen our carbon footprint. Living on an island, you experience global warming firsthand. It's a serious problem, and this project will hopefully set a good example for everyone else to follow."
Keith Ahsoon, Ta'u Resident and local business owner

OPPORTUNITY

The island of Ta'u in American Samoa has relied on diesel generators to supply all of their electricity. Diesel is shipped in at a considerable cost and from great distances. By relying on diesel, the island faces outages, rationing and greater emissions caused by burning diesel. A solar and energy storage microgrid solution provides affordable, reliable, and clean power to the island.

SOLUTION

The goal was to provide energy independence to the nearly 600 residents of Ta'u. The 1.4MW solar PV array and the 750kW / 6MWh battery system offers a more reliable source of electricity. The microgrid allows the island to store and use solar energy 24/7, reduce diesel costs, remove the hazards of power intermittency and make outages a thing of the past. The microgrid is operated by the American Samoa Power Authority.

RESULTS

-**Cost savings.** Substantial savings by replacing diesel generators with affordable solar energy and storage. The microgrid provides stable power costs for decades to come.

-**Reliability.** The microgrid will allow the island to stay fully powered for three days without sunlight and the Powerpack system will recharge fully in seven hours.

-**Clean air.** The system is expected to offset the use of more than 109,500 gallons of diesel per year, which typically results in over 2 million pounds of CO_2.

Customer
Ta'u Island

Location American Samoa

System size
750 kW / 6 MWh Storage
1.4 MW Solar

Applications
Backup Power Peak Shaving Reduce T&D costs
Grid Stability

Commissioned 2016

TESLA ENERGY PRODUCTS

Attachment A – Example Microgrid Projects

"As utilities sign more contracts with expensive coal and gas power plants, we will continue to energise the Philippine countryside with solar and batteries, which are not only cheaper but now proven to be even more reliable than fossil fuel. The people in Paluan, Mindoro now enjoy better service at lower cost than Filipinos in even major cities across our country; and we hope it is only a matter of time before all Filipinos will be able to enjoy the same."
Leandro Leviste, Solar Philippines Founder

OPPORTUNITY

Paluan is a small community based on the island of Occidental Mindoro in the Philippines. The community is classified as 'unserved', meaning their power supply is subject to frequent brown-outs (load shedding) and intermittent supply. The community averages only four to sixteen hours of electricity per day, and at times go days without any power at all.

SOLUTION

To relieve Paluan of their volatile power supply, Solar Philippines, in conjunction with Tesla, has installed and commissioned a 1680 kWh Powerpack 2 Microgrid system. The system is paired with 2 MWp of PV and 2 MW of diesel genset backup serving the remote community.

RESULTS

The community of Paluan is now being provided with power 24 hours a day 7 days a week, removing the hazards of power intermittency to make outages a thing of the past. The project also provides a precedent for other renewable powered microgrid solutions to be deployed throughout isolated regions of the Philippines, enabling them to skip traditional fossil fuel power and accelerate the world's transition to sustainable energy.

Customer
Solar Philippines

Location
Paluan, Philippines

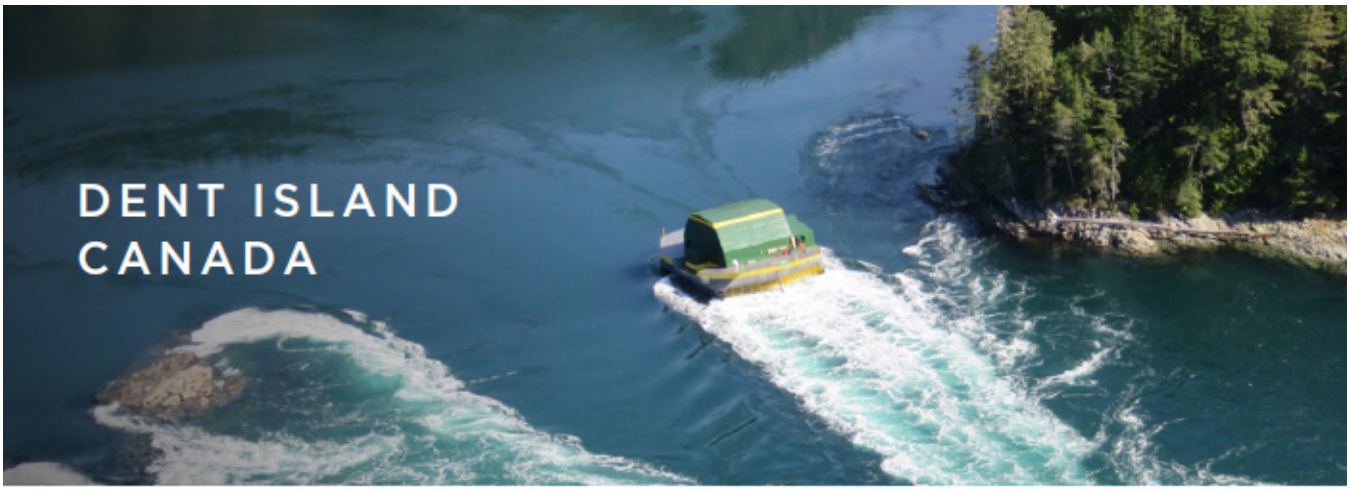
Solar size
2 MW

Powerpack size
424 kW | 1680 kWh

Applications
Micogrid Energy Access
Diesel Abatement

Commissioned
2018

Attachment A – Example Microgrid Projects



"The current power for remote communities, private lodges and resorts can be in excess of 65-cents-per-kilowat range whereas the Water Wall Turbine's power plant, including energy storage, is closer to 20 cents."
Marek Sredzki, CEO Water Wall Turbine

OPPORTUNITY

Dent Island Lodge off the coast of British Columbia is a luxury salmon fishing lodge and wilderness vacation resort that is off- grid. The resort relies on diesel generators for electricity, which means operating costs and emissions are high.

SOLUTION

There was a need for a low cost source of clean and reliable off-grid power for this remote island location. Water Wall Turbine deployed a 500kW tidal energy system off of the Dent Island Lodge. The anchored floating structure uses horizontal radial blades to harvest tidal power and drive a bidirectional turbine. The tidal energy is paired with a 250kW / 500kWh Powerpack system to allow for consistent power delivery. The tidal and storage enabled microgrid will deliver a savings of 45 cents per kWh (from 65 cents to 20 cents). The island will maintain a diesel generator for emergency backup.

RESULTS

- Tesla delivered an all-in-on solution including the batteries, inverters, site master controller and intelligent software.

- Dent Island Resort will realize a savings of 45 cent per kWh.

- By turning off their diesel generators the resort will reduce its greenhouse gas footprint by 900 million pounds annually.

Customer
Dent Island Lodge

Location
Dent Island, Canada

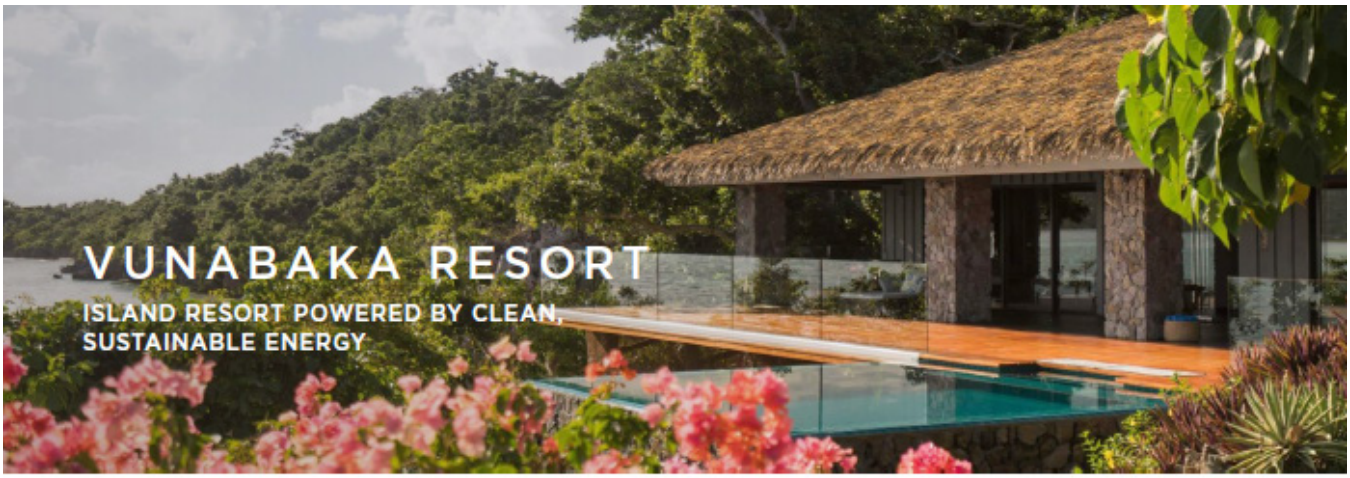
System size
250kW / 500kWh

Applications
Microgrid
Renewable consumption
Diesel abatement

Commissioned
2016

TESLA ENERGY PRODUCTS

Attachment A – Example Microgrid Projects



"Tesla has provided our answer to creating a sustainable power supply to operate an environmentally conscious resort in the remote area of the Fiji Islands. After the 3 month installation period, Tesla connected a very efficient solar and battery system that has exceeded our expectations running the resort and back of house as well. The savings on transportation of diesel with generator fuel consumption and maintenance is significant."
Rob Miller, General Manager, VatuVara Ltd

OPPORTUNITY

Kaibu is home to a remote island resort 100% reliant on diesel generators to power their guest houses, restaurants, pools, administration buildings and their water desalination plant. The resort incurs high costs for fuel and its transportation to the island, as well as generator maintenance and power interruptions from daily shut-downs occur to transfer between generators. Seeking to reduce their operational costs and their impact on the tropical island and surrounding beautiful lagoon, the retreat went about transforming itself into a self-sufficent, ecological place for their guests.

SOLUTION

Under an EPC arrangement, Tesla delivered a complete microgrid system comprised of a 396 kW solar array, 400 kW | 680 kWh Tesla battery system and Microgrid Controller with which Tesla integrated two existing diesel generators to provide a robust design during periods of reduced solar generation. With consideration to island load, solar forecasts and the selected storage size, the system was designed to displace 75% of the existing reliance on diesel generators.

RESULTS

Since commissioning in March 2018, the solar and Tesla battery is now delivering over 83% of the resort's total electrical energy. With the diesel generators now silent, the guests and staff are able to enjoy the beauty of the island with the added benefit of reliable, clean and renewable energy.

Customer
Vatuvara Ltd

Location
Kaibu Island, Fiji

Solar size
396 kW

Battery size 400 kW | 680 kWh

Applications
Microgrid
Diesel Abatement

Commissioned
31 March 2018

TESLA

ENERGY PRODUCTS

Attachment A – Example Microgrid Projects

"The Tesla team has a wealth of microgrid knowledge and consistently added value beyond their scope. Given the harsh project environment and the complex 3rd party integration required to make this project a success, Tesla has outperformed all expectations."
David McDonald, Technical Director, SolarAfrica

OPPORTUNITY

Singita's enduring purpose is a 100-year vision to preserve and protect large areas of African wilderness for future generations. This challenges the accepted notions of luxury by offering award-winning guest experiences without the environmental costs often imposed by other remote hospitality and tourism establishments. In line with this commitment, Singita Kruger National Park contracted SolarAfrica to install a renewable energy microgrid to reduce their dependence on fossil fuels.

SOLUTION

To meet Singita's needs, Tesla integrated a Powerpack system with existing solar photovoltaics (PV) and existing diesel generators to form a hybrid microgrid system, which provides Singita Kruger National Park with a reliable, cost-effective source of energy. The Powerpack system allows the lodges to switch off their diesel generators completely during the day and long into the night by storing excess solar production in the batteries. The flexible and scalable architecture of the Powerpack system means that the microgrid can easily be expanded over time to accommodate Singita's changing energy needs.

RESULTS

The upgraded hybrid microgrid system at Singita Kruger National Park is forecast to provide 1,600 MWh of renewable energy a year to power Singita Lebombo and Sweni Lodges, which is expected to reduce diesel consumption to less than 20% of the total energy supply on site. By saving more than 450,000 litres of diesel per year, Singita will reduce operational costs and emissions while significantly enhancing the guest experience. Without the hum of diesel generators, guests are now able to enjoy the sounds of nature throughout the day and at night when the solar PV isn't generating power.

Customer
Singita Kruger National Park

Location
Kruger National Park, South Africa

Powerpack System
750 kW | 3150 kWh

Applications
Off-grid microgrid
Diesel abatement
Renewable integration
Quiet operation periods

Commissioned
2017

TESLA

ENERGY PRODUCTS

Attachment A – Example Microgrid Projects

OPPORTUNITY

Following a public EU tender procedure, the Government of Eritrea has started a project to provide affordable and sustainable energy to previously off-grid villages and rural towns of Areza and Maidma.

The project was funded by the Eritrean Ministry of Energy and Mines and supported by UNDP and the European Union with the aim to impact over 40,000 residents.

SOLUTION

Customers signed a contract for the supply, installation and commissioning of Solar PV Generation System to create two separate microgrids. Tesla supplied both the battery system and the microgrid controls that intelligently coordinates the various generation and storage components to meet site load reliably, sustainably and cost-effectively.

RESULTS

Before the project was deployed, only a few houses in the villages were having intermittent power (6pm-10pm) from diesel generators.

After project was deployed, up to 40,000 people across multiple villages were able to get continuous and stable clean energy. This allowed villagers to reduce their use of coal for cooking while providing an opportunity for small business owners to store food.

The project enables rural electrification through local generation assets at a fraction of the cost of connecting these remote communities to the main grid and provided direct and indirect jobs to the local communities both during the construction and operation phases.

Customer
Eritrean Ministry of Energy and Mines

Location
Areza and Maidma, Eritrea

Solar size
1000 kW each site

Powerpack size
Site 1: 450kW I 2310kWh
Site 2: 400kW I 1890kWh

Applications
Off-grid Microgrid
Rural electrification
Renewable integration

Commissioned
2018

Attachment A – Example Microgrid Projects

"The addition of a Tesla Powerpack at Xaranna has a lot of really cool functionality and a much longer lifespan. If you look at the savings it would achieve over 20 years, the Tesla system has the best returns, taking the replacement of batteries into account as well as maintenance and servicing."
Deepak John, CEO New Southern Energy

OPPORTUNITY

&Beyond Xaranna Okavango Delta Camp is part of a portfolio of high-yield, low-impact luxury lodges that are operated in a way that is able support vast tracts of biodiverse land. Each lodge is annually subjected to an intensive sustainability audit to determine its environmental impact and determine lodge-specified strategies to reduce that impact. As a result, Xaranna, which previously ran entirely on diesel generators, was identified for a solar hybrid installation to reduce costs, noise levels and emissions.

SOLUTION

The solar hybrid solution consists of a 122.4 kWp solar PV plant paired with a 100 kW | 190 kWh Tesla Powerpack System and 2x 125 kVA diesel generators. A micro-grid controller intelligently coordinates the various generation and storage components to meet site load reliably, sustainably and cost-effectively.

RESULTS

Xaranna's PV plant produces an average of 450 kWh of energy per day, reducing the camp's carbon footprint by 4,500 tons a year. The system has been sized to supply more than 80% of &Beyond Xaranna's electricity requirements from renewable energy. The generator runtime has been decreased from 24 hours to 5 hours. This 19-hour reduction not only saves diesel, but also decreases the generator services and parts required, decreases the transport costs associated with delivering diesel, decreases the emissions caused by generators and transport trucks, and decreases the noise pollution caused by generators.

Customer
&Beyond Xaranna
Okavango Delta Camp

Location
Botswana

Solar size
122 kW

Powerpack size
100 kW | 190 kWh

Applications
Microgrid
Diesel abatement
Renewable integration

Commissioned
January 2017

TESLA

ENERGY PRODUCTS